In patients with shortened dental arches do removable dental prostheses improve masticatory performance?

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For many patients replacement of missing teeth may be indicated to restore oral function, aesthetics and improve quality of life. Whilst rates of edentulism have fallen a partially dentate older population has emerged.[1,2] Unfortunately, there is a limited amount of evidence and little consensus at present about how best to replace missing teeth in these partially dentate patients.[3] One option is utilisation of the Shortened Dental Arch (SDA) concept which aims to provide a functional dentition without the need for a removal partial denture (RPD).[4] Multiple iterations of the SDA exist based on the number and distribution of occluding pairs of posterior teeth.[5]

The aim of this systematic review was to summarise the impact of RPD provision on objective measures of masticatory function in SDA and extreme SDA patients (eSDA). The review question, inclusion criteria and search strategy were clearly defined and a reasonable publication-date restriction was applied. A total of 8 studies were identified and included. However, sample sizes of the included studies were small, ranging from 8-30.

Based on data included from two studies the effect of RPD provision on comminution appears to be inconclusive for SDA patients. One study reported an improvement in comminution, and the other a deterioration, post-RPD provision. A single study showed a 20% improvement in comminution for eSDA patients provided with a RPD. Two further studies demonstrated a longitudinal increase in comminution for eSDA patients provided with RPDs with a greater number of artificial teeth. A similar relationship was found for chewing function and the number of artificial teeth in two separate studies analysing SDA and eSDA. However, increasing the occlusal table through distal-extension saddles, raises the potential for overload of the denture-bearing area and consequently ridge resorption.[6,7] In addition, patient compliance with such removal prostheses is often very poor.

This systematic review illustrates the paucity of high quality evidence to answer this research question. There was significant clinical and methodological heterogeneity amongst the small number of included studies. Unfortunately an assessment of the 'risk of bias' was not included. Only two studies analysed participants who did not act as their own controls and neither incorporated randomisation at the allocation stage.

The authors accept that whilst the masticatory ability of SDA and eSDA patients may be lower than that of subjects with a complete dentition, the overall prevalence of chewing complaints is low in this population.[8-10] However, subjective measures of chewing function and quality of life may be useful tools in determining individual patient need for RPDs. In the first instance, patients with eSDAs could be restored to a longer SDA using fixed prosthodontic options.[11] This approach has been demonstrated to be more cost-effective than RPDs whilst also achieving positive impacts on quality of life and nutritional status .[12-15]

Practice points:
- A SDA should provide sufficient functionality for the vast majority of patients. Extending a SDA with a RPD is not recommended.

- Small span fixed prosthodontics could be considered as a first-line treatment for eSDA patients with chewing complaints.

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